Regulatory perspectives on RES-E market integration

Lucia Passamonti

CEER Sustainable Development Task Force

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Energy Regulators' international activities

- **CEER** (Council of European Energy Regulators):
  - ✓ *2010: Regulatory aspects of the integration of wind generation in European electricity markets*
  - ✓ *2011: Report on Renewable Energy Support in Europe*
  - ✓ *2011-12: Implications of non-harmonised renewable support schemes*
- **ICER** (International Confederation of Energy Regulators):
  - ✓ *2011-12: Renewable Energy and Distributed Generation*
- **ACER** (Agency for Coordination of Energy Regulators):
  - ✓ *2011: Framework Guidelines on Capacity Allocation and Congestion Management for Electricity and on Electricity Grid Connections*

Impacts of RES-based generation on electricity markets

- Significant levels of penetration of intermittent generation technologies (with non controllable variability, partial unpredictability and locational dependency) impact (will impact) on market prices, power system operation and design

- These specific issues should be considered in the context of progress towards a competitive, liberalised EU energy market

Market Design: a multi-dimensional problem - 1

- **Time scales**
  - ✓ **Year(s) ahead of real time**: adequacy of power and grid (capacity markets, long-term hedging instruments)
  - ✓ **Day-ahead and intraday**: transmission and distribution efficiency, generation efficiency, congestion management, reduced emissions
  - ✓ **Real-time**: security and operation of the power system (grid stability, voltage management, reserves, etc.)

Market Design: a multi-dimensional problem - 2

- **Space**
  - ✓ **Neighbouring systems should have coherent market designs:**
    - ✓ Day-ahead and intraday markets (CACM Network Codes)
    - ✓ Transmission Constraints Contracts allocation rules (CACM Network Codes)
    - ✓ Capacity markets (National policies?)
    - ✓ Real time markets and value-based pricing for imbalances inside and between systems (Balancing Network Codes)

Market Design: a multi-dimensional problem - 3

- **Products**
  - ✓ **Support schemes have to be fully coherent with the standard market design (need for harmonised support schemes?)**
  - ✓ **Producers should be given (at the margin but fully) the correct signal of the value of their actions (responsibility for their imbalances?)**

Regulatory challenges

- **To enhance the transition towards a "smarter" power system:**
  - smart distribution grids
  - more flexible generation
- **New regulatory approaches for developing and operating power systems should be envisaged:**
  - Regulation of transmission and distribution grids (planning criteria, cost allocation procedures, business models, siting processes, etc.)
  - Operations (better utilisation of transmission capacity with neighbouring areas, optimal use of storage, improving output forecasting, scheduling of the plants closer to real time, use of demand resources, RES-E plants providing grid services, etc.)

Example: RES-E penetration in Italy - 1

Swift deployment of intermittent generation

- PV plants: from 2,500 MW (end 2010) to above 12,000 MW (end 2011) mainly connected to distribution networks
- Wind plants: from 5,000 MW (end 2010) to 10,000 MW (expected by 2013)

Load variability range: 20,000-50,000 MW

Potential security problems in low demand periods

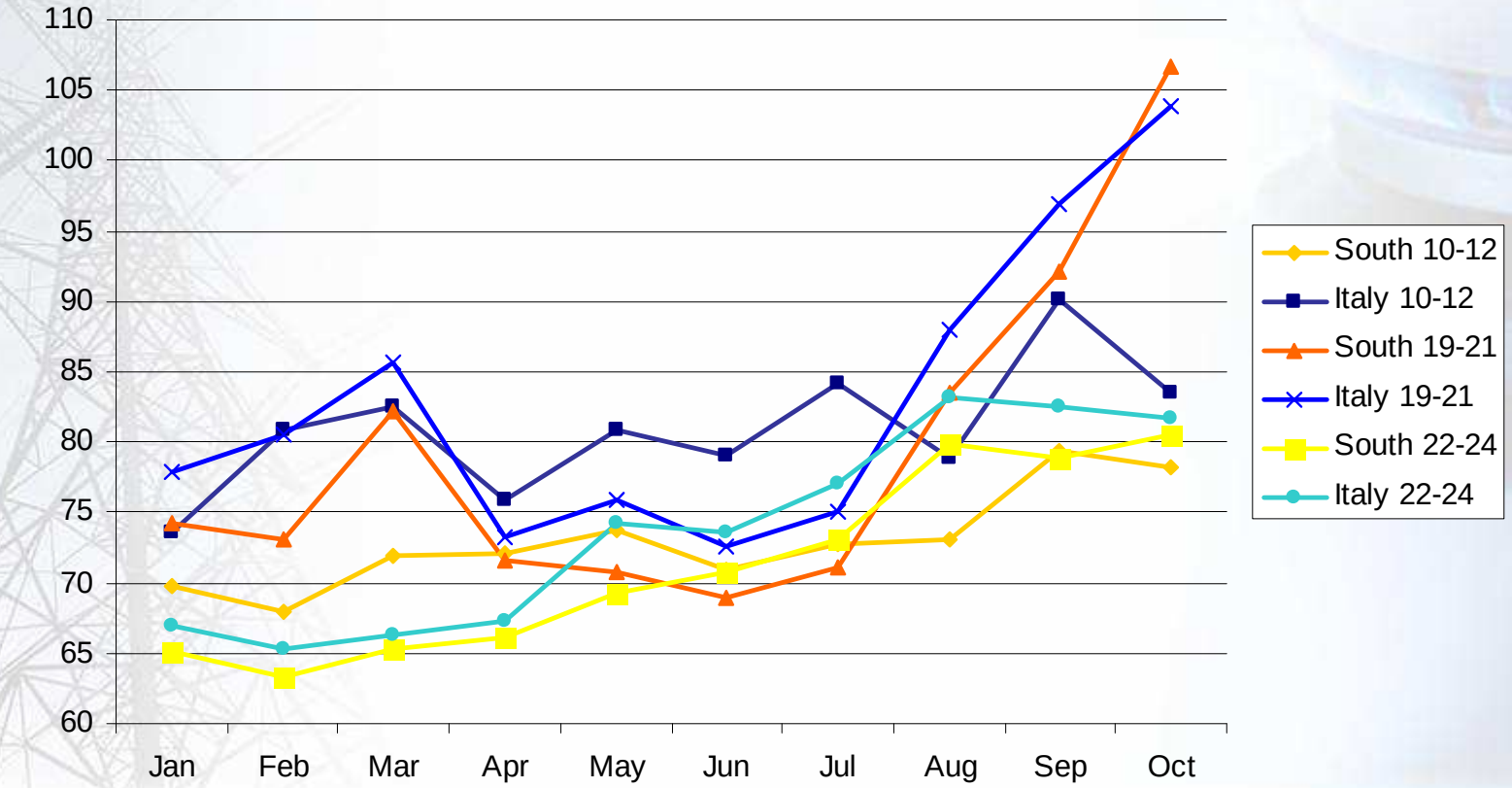
=> *proposal to extend wind plants' obligations for providing grid services also to PV plants and to make RES non-programmable plants responsible for their imbalances*

Impact on evening demand drop-off time periods for PV

=> *price volatility, revision of Time Of Use tariffs*

Example: RES-E penetration in Italy - 2

Wholesale electricity price by group of hours (Italy's day-ahead market), euro/MWh



Thank you for your attention!

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